Effective and reliable site investigation at large sites by the use of initial screening methods

Nielsen, Mette Algreen; Trapp, Stefan; Clausen, Lauge Peter Westergaard; Kalisz, Mariusz; Krupanek, Janusz; Stalder, Marcel; Martac, Eugen; Bartke, Stephan

Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

DTU Environment
Department of Environmental Engineering

Technical University of Denmark

Effective and reliable site investigation at large sites by the use of initial screening methods

Mette Algreen[1], Stefan Trapp[1], Lauge P. W. Clausen[1],
Mariusz Kalisz[2], Janusz Krupanek[2], Marcel Stalder[3], Eugen Martac[4], Stephan Bartke[5].

Background

Conventional site investigations (soil and groundwater sampling), may **involve uncertainties** due to insufficient historical data or sampling density due to limited budgets.

Initial screening methods can be applied faster and with higher sampling density to **target other screening methods** for the most relevant areas.

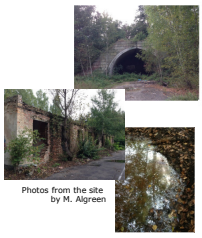
Initial screening methods can be applied as a part of the screening strategy in a **step wise approach**.

Tree coring and **soil gas sampling** are rapid, low-invasive and cost-efficient initial screening methods.

Initial screening methods are well suited at **large sites** or at sites with **insufficient historical information,** and also at sites where conventional drilling is risky (urban, swampy, military sites).

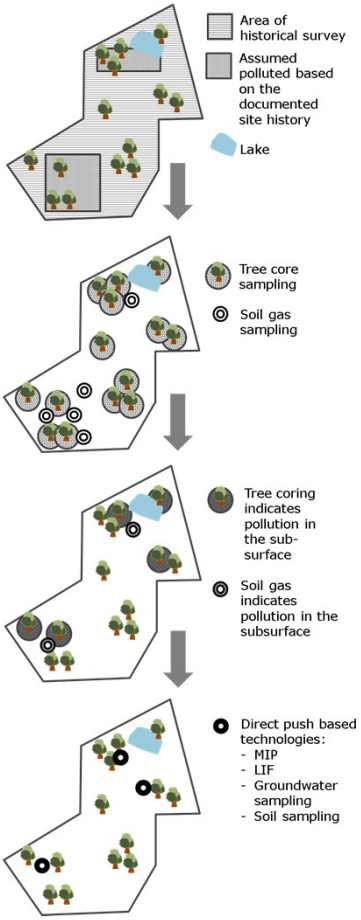
The Szprotawa test site

- A **former military airbase** contaminated with jet fuel and **BTEX** in high risk areas 50-70 mg/kg, outside 2.15 mg/kg.
- **Geology**: relatively homogeneous; a silty cover, followed by sediments, sands and gravels. **Groundwater table** 0.2-7 m (typically 2-3 m) bgs.

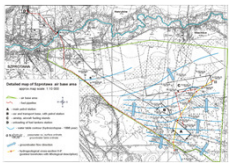

Photos from the site by M. Algreen

Stepwise method application

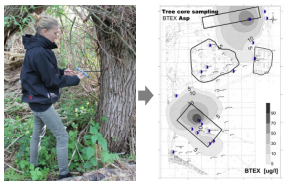
For illustration:

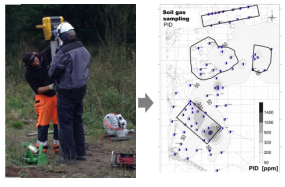


Historical survey



Initial screening





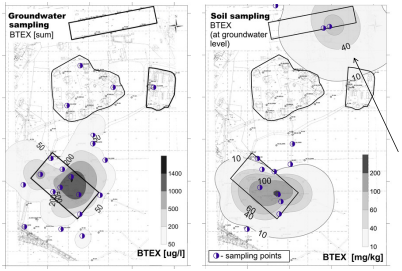
Detailed screening

Outcome from the site investigation

- The stepwise approach can lead to **more effective and reliable site investigations**
- **More areas are investigated**, more data are available
- Initial screening methods can **minimize the risk** of overlooking hot spots or unknown sources

Results by conventional site investigation

Sampling based on historical information

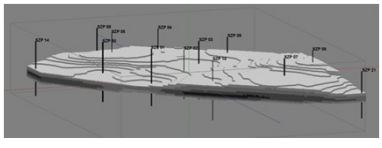


Results by a stepwise approach

Sampling on results from initial screening

Risk area overseen by the conventional approach

- MIP (Membrane Interface Probe) and LIF (Laser Induced Fluorescence) provided **3D information**



Spatial distribution of the high risk area derived from LIF sensing

- The use of multiple (initial) screening methods can deliver more data for the **design of remediation strategies**

Literature:
- http://www.timbre-project.eu/
- Effective and reliable site characterization at megasites by the use of pre-screening methods. (2015). Algreen, M.; Kalisz, M.; Stalder, M.; Martac, E.; Krupanek, J.; Trapp, S.; Bartke, S. Environ. Sci. Pollut. Res, In press

[1]Technical University of Denmark, Kgs. Lyngby, Denmark, [2]Institute for Ecology of Industrial Areas, Katowice, Poland,
[3]SolGeo AG, Solothurn, Schweiz, [4]Fugro Consult GmbH, Mössingen, Germany,
[5]Helmholtz Centre for Environmental Research, Leipzig, Germany.

Acknowledgement: Financial support by the European Community's Seventh Framework Programme FP7, project TIMBRE.

SEVENTH FRAMEWORK PROGRAMME

timbre